

RECONSTRUCTION OF ROADS IN NORTHERN AFGHANISTAN

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ABSTRACT

The roads in Afghanistan are largely deteriorated and the country infrastructure has endured substantial damage over the past 23 years due to sporadic war and instability. The Government has designated the rehabilitation and upgrading of several key roads as a high priority project as it would make a significant contribution to the Nation's economic recovery. The Ministry of Works of Islamic Republic of Afghanistan secured a loan from the Asian Development Bank to undertake the required reconstruction works, which included the rehabilitation of road from Andhkoy via Sherberghan.

This paper discusses briefly on the background to the Project, the state of the road and its appurtenant structures, the scope of the works to be carried out, and reviews briefly the salient issues, which have influenced the rehabilitation and upgrading works. Pertinent issues include climatic conditions, terrain profiles, and requirement for demining (removal of landmines and unexploded ordnance) activities ahead of construction, security threats, unavailability of construction materials and equipment, lack of adequately trained personnel, construction logistic problems and communication.

1. INTRODUCTION

The northern link road, a 182 km stretch linking Balkh to Andkhoy, provides access to Afghanistan's northern populated areas. The initiative by the Ministry of Works, Afghanistan to rehabilitate the road was given high priority, as it would make a significant contribution to Afghanistan's economic recovery and political stability. Rebuilding the road network not only expedited economic recovery and growth in Afghanistan, but also promoted regional trade. Another important goal was to improve the livelihoods of Afghans who have been displaced by providing them employment in the construction industry thus helping them to successfully re-integrate into the Afghan community. The road starts at Balkh town and spans westward to Andkhoy passing through Sherberghan. It passes through the minor towns of Aqcha and Khanaqa. Major link to the road include Meymaneh in Faryab Province, Aquina near Turkmenistan border and Termez near Uzbekistan border. The project consists of upgrading and rehabilitation of existing roads. The stretch from Balkh to Sherberghan is about 110km and is paved. Fifty percent of the remaining stretch from Sherberghan to Andkhoy is unpaved.

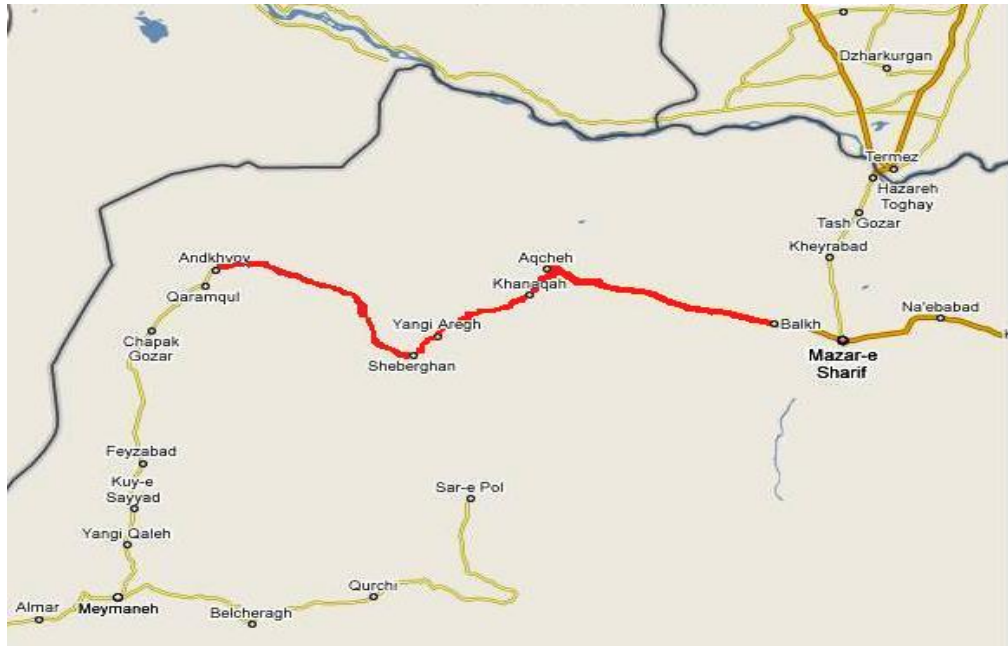


Figure 1: Map of Afghanistan showing the road network from Adkhoy to Sherberghan.

2. CONSTRUCTION COST AND CONTRACT

The US\$36 million-road project was funded by the Asian Development Bank (ADB). Minconsult was appointed as the supervising engineer and the Construction work was awarded to Samwhan Corporation from Korea who started in May 2004. The project was constructed under FIDIC terms and conditions.

3. COUNTRY BACKGROUND

Afghanistan is a mountainous, arid, land-locked country with limited natural resources, bordered by Pakistan to the east and south; Tajikistan, Turkmenistan, Uzbekistan, and China to the north; and Iran to the west. It is 647,500 square kilometers in area and its population estimated at 27.8 million, is ethnically diverse, largely rural, and mostly illiterate. The country is divided into 32 provinces with over 300 districts.

4. TOPOGRAPHY AND CLIMATE

The project road traverses through plain terrain except at a few locations where the road passes through rolling terrain. A natural gas line ran along certain stretches of the project road. The yearly average temperature of the project corridor is about 18 degree Centigrade and snow is expected in December around Balkh and falls below freezing point during the night. Yearly average rainfall is about 183 mm. Some areas are subjected to severe sand storms particularly the stretch between Sherberghan and Andkhoy.



Fig 2: Snow covered road during winter season.

5. EXISTING ROAD CONDITION

The recorded traffic during the preconflict period on the primary network varied between 250 and 1,000 vehicles per day. Recent traffic surveys indicate that the traffic levels have grown fast and have significantly exceeded these figures. The road conditions had further deteriorated due to lack of rehabilitation and maintenance. To keep up with increasing traffic volume, promote trade links with neighboring countries, and improve movement of goods and services, thereby fostering trade and commerce, it was essential that the entire primary road network be rehabilitated on a priority basis.

The 132 km Mazare Sharif – Sherberghan road section, and the 48 km section of the Sherberghan – Andkhoy road (72 km) showed signs of major distress and required major pavement strengthening. The 24 km remaining unpaved section of Sherberghan – Andkhoy road required embankment rehabilitation and construction of asphalt pavement.

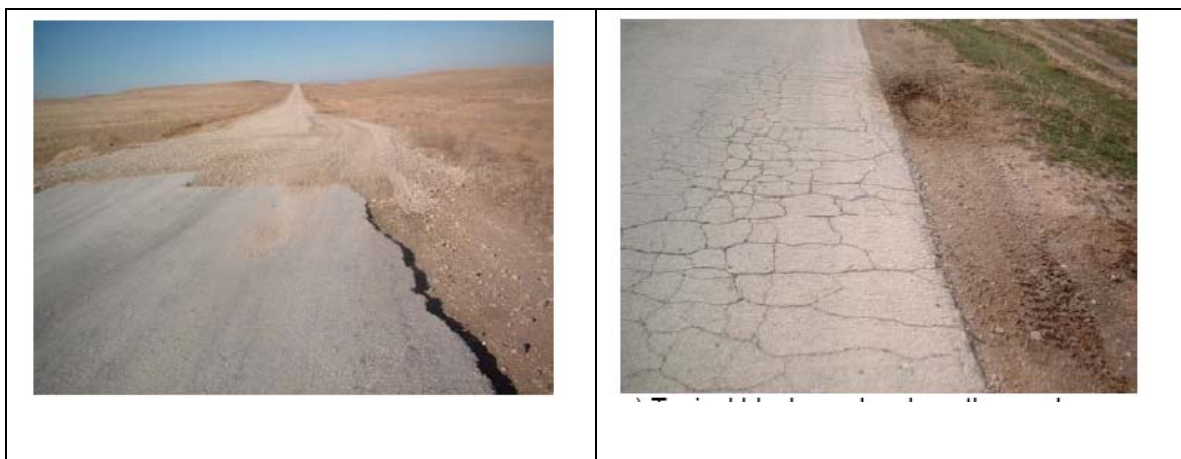


Figure 3: Road condition before commencement of project

6. PAVEMENT WORKS

The project covers the rehabilitation of 180.7 km of single carriageway in the Balkh, Jawzjan and Faryab Province.

The road works from km 22+000 to km 202+698 include:

- flexible pavement rehabilitation comprising of removal of existing asphalt surfacing and laying of new crushed stone road base, asphaltic concrete base course and asphaltic concrete wearing course (159km);
- preparation of existing sub grade and construction of new flexible pavement consisting of granular sub base, crushed stone road base, asphaltic concrete base course and asphaltic concrete wearing course (22 km);
- improvement of vertical realignments (16km)

The design life spans of 15 years have been specified by the Ministry of Works and the following are the design traffic loading (ESA) used.

Section	ADT Commercial Vehicle	Design Traffic Loading (ESA)
Balkh ~ Sheberghen	2,494	10.078
Sheberghen ~ Andkhoy	1,687	11.113
Unpaved	1,687	11.113

Table 1. Design Traffic Loading (ESA)

Note: ADT- Average Daily Traffic

7. BRIDGES REHABILITATION

All twelve bridges identified along the project route required repair of abutments, pier protection, replacement of bearings, and replacement of expansion joints. Structural repair, desilting and clearing of culvert barrel are the main activities of the drainage works. New culverts were also constructed where the alignment was revised.

The construction date and design loads for these bridges are unknown. The load bearing elements are in good condition for all these 12 bridges. The bridge decks are in the form of T Girder with slab or Solid Slab spanning from 5.5m to 16.7m



Fig 4: Two spans bridge using T Girder

Most of the river bridges showed signs of distress due to failure of expansion joints, loss of railings and damage of bearing under the T-Girders at supports. At several bridges there were bullet holes, concrete spalling, and exposure of steel reinforcements. Some of these bridges were designed without approach slabs. Some of them had approach slabs but the existing approach slabs were in bad condition.

Common drainage problems for these bridges were erosion and drainage outlet clogged with earth. The riverbank protections were either very poor or no protection was available. Some of the riverbeds were silted thus resulting in vertical clearance problems. All the repair/replacement details were based on the contract technical specifications, AASHTO 17th Edition, 2002.

8. DE-MINING

Afghanistan's landmine and unexploded ordnance (UXO) problem is the consequence of more than 23 years of war against Soviet invasion (1979-1989), civil fighting (1989-2001) and the military operations against Al-Qaida and Taliban (since October 2001).

Substantial demining works were carried out along the course of the highway in advance of the construction of the road staying ahead of the construction crews. The project had allocated the sum of USD 256,000 for the all the demining works along the project right of way and was the first construction activity. A hazard was posed to the project team who had to do early works for reconnaissance & planning works prior to demining.

9. SETTING UP OF SITE OFFICE

The site office was located along the main road, around 2 km from the Sherberghan city centre. Communication facilities available at the site office were Internet connected through a satellite with a satellite disc mounted and powered by generators. Also available were satellite phones, walkie-talkie and "Codan" wireless set installed in 4 Nos of the vehicles. All these were to be used in the event of any security unrest. For normal day-to-day operations the site team used the Internet and mobile phones.

10. BANKING PROBLEMS

After 23 years of war, there was also profound institutional destruction. The army ceased to exist as an institution; the police ceased to exist and most ministries were no longer functioning as modern ministries. The financial system was non-existent and no private banks operated in Afghanistan. Standard Chartered opened a branch in Kabul on 18th September 2003 and it was the first major international bank. Prior to the establishment of this bank, firms and NGOs operating in Afghanistan had to keep large amounts of cash in hand, for operations purposes and was a significant security risk.

11. SECURITY THREATS

A common feature of rebuilding a war torn country like Afghanistan is that those element who do not want the country to be reconstructed will target the projects to delay their progress. Therefore the project anticipated some security problems and threats.

The greatest security risks areas are heavily concentrated in the southeast. The reconstruction effort was not being slowed down significantly by the security threats around the rest of the country. Even though we were under the UN security umbrella, we had to fend for ourselves when traveling on road and rely on the local police protection that the contractor had engaged as provided for under the contract. Our site office/camp was surrounded by security walls with armed security guards (local police) stationed at the back and front.

On June 2004, In the neighbouring site of Jelogir area, 36 km away of Kundus city: a group of about 20 armed men attacked the Chinese workers compound killing 10 persons on the spot and injuring five others. Many of the victims were from the China Railway Shisigu Group, a leading construction company engaged in road construction in post-war Afghanistan.

Despite the local security problem, the project had progressed with minimal delay and achieved its objective.



Figure 5: Damaged asphalt paver



Figure 6: Remnant of the rocket grenade

12. CONSTRUCTION LOGISTIC PROBLEMS

Most of the construction materials were imported because Afghanistan does not produce them or produces limited amounts. Cement, which was one of the most important components in construction, was imported from Pakistan and Iran. Similarly, almost none of the construction equipments needed was available locally. As a result, paving machines, compactors, bulldozers, grades, cranes, asphalt mixing plants and rock crushers needed to be imported. The last 20 km stretch was the most difficult as the stretch was unpaved. The area is scarce of water supply, a long distance from approved quarries and the contract required this stretch to be completed before any other sections in order to reduce the travel time for the whole project stretch.

13. MATERIAL FOR CONSTRUCTION

Quality crushed materials for wearing course and base course for asphalt pavement was difficult to source throughout the 182 km of the road project. The nearest quality material available was 500 km away, eg. at Salang tunnel area. Most of the nearest mountainous area are made up of limestone material. Good quality material was available within the first 20km of the project and it was more difficult beyond that. Most of the gravels were taken from old riverbeds close to the site and tight quality control was instituted to ensure it reached the required quality.

Another major difficulty in completing the road was that the construction materials other than gravel needed to be imported from more than 2000 km away, primarily from neighboring countries. Bituminous is sourced from Iran and all steel was sourced from Russia.



Figure 7: Project Quarry Site

14. SOCIAL IMPACT AND PUBLIC RESPOND

The Consultant was asked to prepare a social screening and mitigation plan, which was used by the Contractor during the construction period. The Contractor's efforts towards employment of the locals and the utilization of local resources were monitored by the Consultant.

The local people were very responsive to the project and were very happy with the construction of this road in their area. With the construction of the road the traveling time from Mazar Shariff to Sherberghan which used to take between 3.5 to 4 hours was reduced to 1.5 hours. The travel time from Sherberghan to Andhkoy used to take between 4 to 5 hours due to the bad condition of the road, in particular the last 22km toward Andhkoy which was unpaved. With the completion of the road, it now only takes them 1 hour 15 minutes to reach Andhkoy from Sherberghan. With this new road the

taxi fares have been reduced drastically thus there is cost savings to the people, easy access to the towns, market, schools, hospital etc. Many new shops, petrol stations and schools have cropped up along this new road. The traffic volumes have increased on the road and the goods coming from Turkmenistan through Andhkoy have also increased. The number of accidents has also reduced with the completion of this new road.

15. PROJECT SCHEDULE

The original completion time for this project was 24 months starting from May 08, 2004. However, due to unforeseen circumstances the project was extended for another six months and EOT approved for the contractor to 08 November 2006. The main reasons for the EOT's are:

a. Work Stoppages during the Afghanistan Election Period

The Transitional Islamic State of Afghanistan was holding its first democratic elections after many years and two years after the fall of the Taliban. It was generally perceived that the peace and order during the elections would be unstable due to the serious threats from various parties, especially the Taliban, to disrupt the democratic process. Contingency plans were in place in the event that the elections would be disrupted. Accordingly, the works were stopped from October 5, 2004 – October 12, 2004.

b. Various Security Threat on Site:

The contractor, given the magnitude of the project, undertook nighttime works or a two-shift schedule in order to complete the project within the contract period. The contractor encountered numerous security breaches on site, which prevented him from implementing their plan. Security was a major problem for the duration of the project and greatly slowed down the rate of progress because the contractor was not permitted to work extended hours (longer than eight hours daily). Although the Contractor worked eight hours per day, the delays that were encountered could have been offset to some extent by extending working hours into the evening or by adding a complete extra shift in each 24-hour period.

As for the project, the team experienced two serious security threat. Half way through the project, bombs were planted under one of the bridges that was under going rehabilitation. In another event a group of men fired rocket-propelled grenades on the construction equipment. In both cases there was no human casualty. Scary events like these will demoralise workers and hinder the progress of work for a few days. Works were only resumed once security returned to normal.

c. - Flash Floods in May and June 2005

Flash flood occurrences on site on two different dates, May 10, 2005 – May 13, 2005 and June 12, 2005 – June 16, 2005 resulted in the design at the flooded area to be reviewed by the consultant and revised accordingly by providing additional Box culverts and raising the embankment at the affected area to prevent such occurrence from happening in the future and damaging the embankment.

16. PRELIMINARY ASSESSMENT OF SUSTAINABILITY

As the Andhkoy – Balkh road is heavily trafficked especially now after the completion of the construction, significant budget allocations will have to be made by the Government of Afghanistan to ensure that the road can be properly maintained. Sustainability will depend heavily upon the establishment of revenue collection systems by the Government of Afghanistan. The Government is currently going through a complex transition, as Afghanistan itself moves from dependence upon donor assistance to becoming a financially viable state with a sustainable domestic economy.

The Government is looking at various ways to collect sufficient revenues particularly from those that benefit from the road or the overall road network (customs, taxes, tolls, etc) to cover its financial commitments and maintenance responsibilities. One issue that may need to be addressed in the future involves the re-establishment of toll collection mechanisms along major highways under Central Government auspice. In the 1960s and 1970s, before the Soviet invasion and the subsequent wars, the Central Government had established toll collection systems along all the major highways of the country.

In order to make the Balkh to Andhkoy Highway truly sustainable, it may prove necessary to re-establish additional revenue collection systems and then find suitable ways to channel this revenue back to the Ministry of Public Works so that it can undertake proper operations and maintenance of the highway. Some capacity building for the MPW may also prove necessary, to ensure that they undertake proper O & M functions in a timely manner. The Government will also have to establish a weight bridge in Andhkoy and Balkh to ensure no overweight vehicles traveled on these roads as the life span of these roads will be greatly reduced and the road will be damaged if no enforcement is done.

17. CONCLUSION

There is a wide gap in expertise and competitiveness between local Afghan firms and international firms. Most major projects are awarded to international firms, who have expert engineers, modern machinery, management skills and latest construction materials. Afghanistan sorely lacks in domestic machinery and construction equipment. All such equipment needs to be imported.

The Afghanistan government has encouraged joint participation, and ADB requires Afghan participation for all bidders on road projects. Unfortunately, Afghan companies have difficulty taking advantage of these opportunities. The most salient obstacles to growth of trade and investment in Afghanistan generally are inadequate property rights protection, a lack of Afghan managerial expertise, and the slow pace of privatisation efforts. Construction firms should take note of these factors in preparing their plans for operations in Afghanistan.

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